

CLAIM SHEET

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09/280,637



1) (Amended) -A method of detecting degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said the~~ method comprising

applying a magnetic field to a portion of said the cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with said the magnetic field; and

identifying, based on the magnetic flux monitored at the position between the poles, locations along said the cord members exhibiting magnetic flux leakage, wherein said the locations are indicative of degradation.

2) (Amended) A ~~The~~ method according to claim 1, wherein

said the magnetic field is applied by relative movement between said the rope and a magnet the magnetic poles.

3) (Amended) A ~~The~~ method according to claim 1, wherein

~~said the body of the rope comprises a body of non ferromagnetic insulator material having~~ has a generally rectangular cross-section in which ~~said the plurality of ferromagnetic cord members are distributed and extend longitudinally therewith.~~

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4) (Amended) A method of detecting and locating degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~ the method comprising

causing ~~said~~ the rope to move at a known rate relative to a magnet pair of magnetic poles positioned adjacent to the body of the rope and spaced longitudinally relative to the rope in order to apply a magnetic field to a portion of ~~said~~ the cord members;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~ the magnetic field as a function of time; and

identifying, based on the magnetic flux monitored at the position between the poles, points in time in which ~~said~~ the cord members exhibit magnetic flux leakage, wherein ~~said~~ the points in time are indicative of the location of rope degradation.

5) (Amended) A method for approximating tension-load bearing capacity of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~ the method comprising

applying a magnetic field to a portion of ~~said~~ the cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

measuring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~ the magnetic field; and

comparing, based on the magnetic flux measured at the position between the poles, ~~said~~ measured magnetic flux leakage to predetermined data indicative of tension-load bearing capacity.

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6) ~~A~~(Amended) A method of detecting and locating degradation of a rope comprising a body of non-ferromagnetic insulator material in which a plurality of longitudinally extended ferromagnetic cord members is distributed transversely, ~~said~~the method comprising

applying a magnetic field to a portion of ~~said~~the cord members by positioning a pair of magnetic poles adjacent to the body of the rope, wherein the poles are spaced longitudinally relative to the rope;

monitoring, at a position between the poles along a longitudinal direction of the rope, magnetic flux emanating from the cord members out through the body of the rope and associated with ~~said~~the magnetic field;

identifying, based on the magnetic flux monitored at the position between the poles, locations along each individual cord member exhibiting magnetic flux leakage, wherein ~~said~~the locations are indicative of degradation; and

correlating ~~said~~the locations indicative of degradation of individual cord members with respect to each other to determine relative locations of each.

7) ~~A~~(Amended) The method according to claim 3, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

8) ~~A~~(Amended) The method according to claim 4, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

9) ~~A~~(Amended) The method according to claim 6, further comprising measuring the magnitude of ~~said~~the magnetic flux leakage.

10) ~~A~~(Amended) ~~An apparatus for detecting and locating degradation of a rope comprising a rope body of non-ferromagnetic insulator material encasing having at least one longitudinally extended ferromagnetic component, said~~the apparatus comprising

a detector body comprising rope guide means for guiding ~~said~~the rope along ~~said~~the detector body;

a magnet fixed with respect to ~~said~~the body- for establishing a magnetic field adjacent to ~~said~~the detector body, the magnet comprising a pair of magnetic poles located adjacent the rope body and spaced longitudinally relative to the rope when the rope is guided along the detector body by the rope guide means;

magnetic flux sensing means mounted with respect to ~~said~~the detector body at a position between the poles for monitoring magnetic flux emanating from the ferromagnetic component out through the rope body and associated with ~~said~~the magnetic field; and

means for correlating ~~said~~the magnetic flux with ~~said~~ rope to determine one or more locations of degradation.

11) ~~A~~(Amended) ~~The apparatus according to claim 10, wherein~~

~~said~~the rope comprises a plurality of the ferromagnetic cord members.

12) ~~A~~(Amended) ~~The apparatus according to claim 11, wherein~~

~~said~~the magnetic flux sensing means comprises a plurality of magnetic flux sensors mounted to ~~said~~the body.

13) ~~A~~(Amended) ~~The apparatus according to claim 12, wherein~~

~~said~~the magnetic flux sensors comprise Hall effect transducers.

14) ~~A~~(Amended) ~~The apparatus according to claim 12, wherein~~

~~said~~the plurality of magnetic flux sensors each corresponds to one of ~~said~~the ferromagnetic cord members such that each magnetic flux sensor monitors the magnetic flux of a respective one of ~~said~~the cord members.

- 15) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, further comprising control means for correlating the magnetic flux detected by each of ~~said~~the magnetic flux sensors.
- 16) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, wherein ~~said~~the plurality of magnetic flux sensors are positioned with respect to ~~said~~the body so that they remain on one side of ~~said~~the rope when it is guided along ~~said~~the body.
- 17) ~~A~~(Amended) ~~#~~The apparatus according to claim 14, wherein ~~said~~the plurality of magnetic flux sensors ~~are~~is positioned with respect to ~~said~~the detector body so that ~~they~~the magnetic flux sensors are on opposing sides of ~~said~~the rope when it is guided along ~~said~~the detector body.
- 18) ~~A~~(Amended) ~~#~~The apparatus according to claim 10, further comprising means for mounting ~~said~~the apparatus in an elevator assembly in such a manner as to enable ~~#~~the rope guide means to engage and guide an installed elevator rope with said rope guide means for detecting and locating so that the apparatus can detect degradation of ~~said~~the elevator rope.
- 19) ~~A~~(Amended) ~~#~~The apparatus according to claim 10, further comprising means for mounting ~~said~~the apparatus to an elevator hoist machine assembly in an elevator assembly in such a manner as to enable the rope guide means# to engage and guide an installed elevator rope with said rope guide means for detecting and locating so that the apparatus can detect degradation of ~~said~~the elevator rope.

20) ~~A~~(Amended) ~~#~~The apparatus according to claim 10, wherein

~~said~~the apparatus is a self-contained, portable unit adapted to be transported to and from an elevator assembly for use therewith to enablethe rope guide means ~~it to engage and guide an installed elevator rope with said rope guide means for detecting and locating so that the apparatus can detect degradation of said~~the elevator rope.

32) (Amended) A monitoring system for monitoring the ~~level of excitation approximate load-bearing capacity~~ of an elevator rope having a longitudinally-extended load-bearing element that supports the tension loads of the elevator system and a jacket that encompasses the load-bearing element, said monitoring system comprising

excitation means for exciting said load-bearing element in a manner such that said jacket is not subject to excitation; ~~and~~

monitoring means for monitoring the level of excitation of said load-bearing element; and

correlating the level of excitation with the approximate load-bearing capacity of the elevator rope.

33) (New) The apparatus according to claim 10, wherein the means for correlating determines one or more locations of the rope degradation.